

Effect of survey start time on counts of the Glow-worm *Lampyris noctiluca* (Col.: Lampyridae)

Transect counts of adult female Glow-worms *Lampyris noctiluca* (Coleoptera: Lampyridae) have been undertaken as part of the Essex Glow-worm Survey which started in 2001 with the aim of determining whether the county population is declining (Gardiner, T., Pye, M. & Field, R., 2002. Glow-worms *Lampyris noctiluca* L. (Coleoptera: Lampyridae) in Essex: results of the 2001 Essex Glow-worm Survey. *Essex Naturalist* **19**: 151-159). The survey required each transect to be at least 100 metres in length and to be walked once in each of three two-week periods: 9 – 22 July, 23 July – 5 August, and 6 – 19 August in all years of the survey. Any glowing adult females which were observed along the route were recorded. Survey participants were required to commence each walk between 22.00 and 23.00 hours, and to terminate by 00.00 hours, as suggested by Gardiner & Tyler (2002. Are glow-worms disappearing? *British Wildlife* **13**: 313-319). Adult females usually start glowing after sunset when the light falls to a certain level (which during the summer is generally between the hours previously mentioned), although there is no scientific data that quantifies the required light intensity for glowing to commence. Females may also have an internal 'clock' which regulates when they glow each day, for example, females kept in complete darkness glow once a day as they would in the field (Tyler, 2002). Most females have been observed to stop glowing after 00.00 hours.

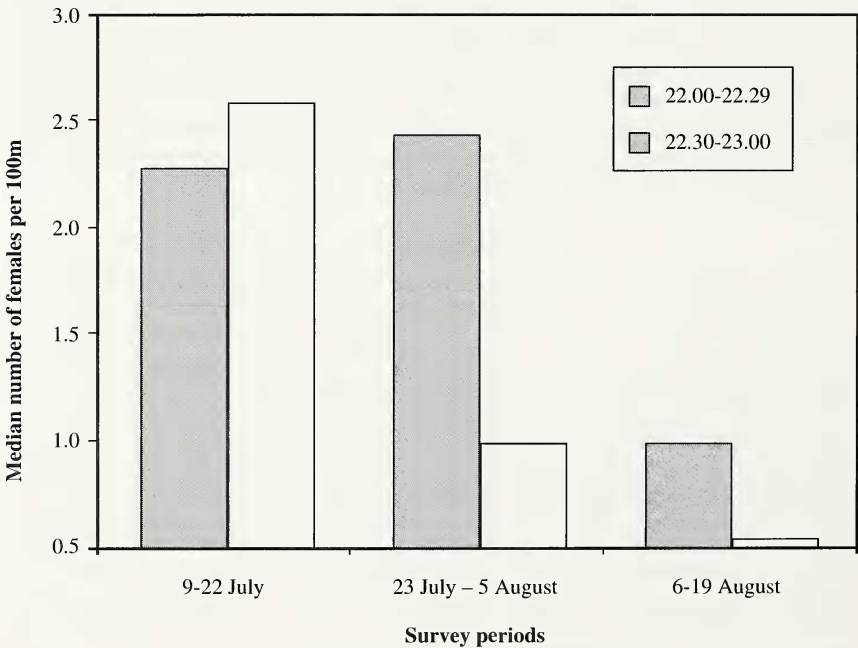


Figure 1. Density of adult female *Lampyris noctiluca* for surveys starting between 22.00 – 22.29 hours and 22.30 – 23.00 hours in the three survey periods.

A slow strolling pace (average walking/searching speed was 0.7 km/hour) was recommended for the walks to reduce the risk of overlooking glowing females along the route. Most walks were fairly short in duration (average survey time of 37 min).

It has become evident that survey start time has a significant effect on counts of females. In period 1, there was no real difference between counts of glowing females from surveys that started between 22.00-22.29 hours and 22.30-23.00 (Figure 1). Sunset times (for London) for this period were 21.16 on 9 July and 21.03 on 22 July, so most surveys were starting approximately one hour after sunset. However, as the monitoring progressed into late July/early August (periods 2 and 3), surveys that started between 22.30-23.00 yielded extremely low counts in comparison to those commenced between 22.00-22.29 h (Figure 1). As sunset times became earlier in periods 2 (21.02 on 23 July, 20.41 on 5 August) and 3 (20.40 on 6 August, 20.15 on 19 August) it is clear that less females were seen after 22.30 hours. This may be due to earlier 'lighting up' times in late summer (other surveys found females glowing as early as 21.35 and 21.00 in periods 2 and 3 respectively) leading to the majority of females having mated and stopped glowing (Tyler, 2002. *The Glow-worm*. Lakeside Press, Sevenoaks), before the later surveys, after 22.30, commenced.

In conclusion it is crucial that criteria for surveying glowing females reflect the earlier sunset and 'lighting up' times (of females) in late July/August. Surveys in late July/August should start as close to 22.00 h as possible to avoid low counts of glowing females. It is also important to remember that the light level needs to have fallen sufficiently (e.g. difficult to make out colours) before females 'light up' and the survey can commence (Tyler, 2002).— TIM GARDINER, Centre for Environment & Rural Affairs (CERA), Writtle College, Lordship Road, Writtle, Chelmsford, Essex CM1 3RR (E-mail: tg@writtle.ac.uk).

Hazards of butterfly collecting. From the Nilgiri to the Biligiriranga Mountains, South India, 1986

On 30 May, 1986 I woke up in a rather crummy guest house of the Glenburn Estate in the Nilgiri Mountains in southern India – I had already been advised that the better one was being renovated. I had been rudely expelled from my comfortable lodgings 30km away in Kotagiri and 600m up. Actually, rudely is not the correct term. When I took up residence for six months in Kotagiri at the old boarding-school, where I had earlier lived between the ages of 10 and 14, I was warned that my stay would be disrupted. The caveat was issued by the last Danish missionaries in India – two splendid ladies running a couple of universally acclaimed secondary schools for girls in Tamil Nadu.

My eviction had been tempered by the ladies bringing me a huge stack of Danish newspapers and magazines. My aspirations for the first day in exile were simple. I would sit on the porch, enjoying the splendid view, dipping into the jack-fruit that had thoughtfully been provided by my host, and perusing the Danish press. This was not to be.